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MASTER OF MILITARY STUDIES

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THE MARINE ENGINEERS IN TODAY'S MAGTF: HISTORICAL PERSPECTIVE,  
CONSEQUENCES AND ALTERNATIVES

SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF MILITARY STUDIES

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## *Table of Contents*

	Page
TABLE OF CONTENTS.....	iii
LIST OF ILLUSTRATIONS.....	iv
DISCLAIMER.....	v
PREFACE.....	vi
EXECUTIVE SUMMARY.....	viii
INTRODUCTION.....	1
HISTORY.....	3
Inception through the Cold War.....	3
Desert Storm through the Long War.....	8
Long War to the Present.....	9
Present Initiatives.....	11
ANALYSIS.....	13
Challenges.....	14
Degraded Capability and Capacity.....	14
Diminished Aggregate Knowledge.....	15
Exclusion of Senior Engineer Leadership.....	16
Inhibited Flexibility for Resource Leveling.....	17
Mission and Capability Incompatibility.....	18
Mitigation.....	19
Degraded Capability and Capacity.....	19
Diminished Aggregate Knowledge.....	20
Exclusion of Senior Engineer Leadership.....	21
Inhibited Flexibility for Resource Leveling.....	21
Mission and Capability Incompatibility.....	22
CONCLUSIONS.....	23
APPENDIX 1: MAGTF ENGINEERS.....	25
APPENDIX 2: FSRG REORGANIZATION PLAN.....	27
ENDNOTES.....	30
BIBLIOGRAPHY.....	33

## LIST OF ILLUSTRATIONS

Figure 1 Force Service Support Group Organization .....	8
Figure 2 1 <sup>st</sup> Marine Logistics Group Organization .....	11
Figure 3 Engineer Support Battalion Organization Changes.....	12-13

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## *Preface*

In 2010, the Marine Corps convened a Force Structure Review Group (FSRG) to lean forward on analysis of Marine Corps structure in anticipation of force reductions expected at the conclusion of operations in Iraq and Afghanistan. This analysis resulted in significant changes to engineer force structure in the Marine Corps. These recommended changes generated significant discussion within the engineer community regarding potential outcomes. In order to develop my view I felt it would be instructive to gain a broader perspective than my singular experience. I felt that analysis of history, understanding of doctrine and strategic planning guidance, linked with inputs from colleagues, would most ably inform my study.

In order to gain perspective in shaping my opinion of the matter I chose to explore the history of the development of Marine Corps Engineer structure to understand the reasons behind organizational changes Marine Corps Engineer formations since origin. This I hoped would help balance my view of the most recent changes. I also reviewed planning guidance published by military leadership and examined published and unpublished commentary and solicited input from colleagues informed about the topic.

The preponderance of the historical discussion is drawn from a publication prepared by Major J.D. Grelson in his independent research project Fleet Marine Force Reference Publication (FMFRP) 12-52 published 21 August 1989. The Commandant's Planning Guidance, Force Structure Review Group Report and Engineer and EOD Roadmap 2025 provide the strategic guidance from which I form my analysis. My analysis of current doctrine, published and unpublished critiques and dialogue with peers and leaders help shape my discussion.

The synthesis of these inputs hopes to provide an informative, balanced discussion that promotes continued development of Marine Corps engineer formations for optimal support of the

MAGTF. In summary, this paper seeks to explore where we came from, why we were organized in that way, consider the rationale in relation to current circumstances and assess recommended changes for future employment of engineer formations.

## **Executive Summary**

**Title:** The Marine Engineers in Today's MAGTF: Historical Perspective, Consequences and Alternatives

**Author:** Major Scottie Redden, United States Marine Corps

**Thesis:** Changes to engineer organization directed as a result of recent force structure analysis present significant challenges to the operational effectiveness of engineer formations. While the prescribed changes are intended to "provide a strategically mobile, middleweight force optimized for rapid crisis response and forward-presence"<sup>2</sup>, analysis of the historical development of engineer organizations, doctrinal employment and the relationship with the joint force informs the opinion that these initiatives require focused attention, action and continued evaluation and refinement to ensure that Marine Corps engineers provide continued responsiveness to supported force requirements.

**Discussion:** Since inception in the early 1900s, organization and employment of engineers has been a constant conundrum. Marine Corps leaders have grappled with the balance of tactical employment and technical support. Engineer formations in the Marine Corps have adjusted to not only the operational environments of World War II, the Korean War, Vietnam, Desert Storm the Cold War and the Long War but also the military force reductions that invariably followed the conclusion of these conflicts. Doctrine, training and equipment for engineers constantly fluctuated during this time. The most relevant analysis and resulting changes to current engineer organization occurred between the end of the cold war and the current operating environment. A number of studies in the late 1980s and throughout the 1990s have driven engineer organizational change to the present day. Lessons learned post OEF and OIF combined with structure reorganization driven by fiscal constraints and post Cold War complexity demand further adjustment. Most recently, requirements indicated by the 2010 Force Structure Review Group findings direct further organizational change. Analysis of past doctrine and employment against future objectives suggests that such reorganization will present unique challenges for engineer formations and create serious risks to responsiveness of engineer capabilities. The potential consequences of engineer organizational change warrants discussion.

**Conclusion:** The recent changes to engineer structure in the interest of meeting capability requirements for the Middleweight Fighter vision creates unintended consequences that if not addressed will negatively impact operational readiness and responsiveness to the MAGTF. Focused effort in mitigating these impacts is necessary to ensure that Marine engineers remain responsive to the needs of the force.



## INTRODUCTION

*“More than most professions, the military is forced to depend on intelligent interpretation of the past for signposts charting the future. Devoid of the opportunity, in peace, for self-instruction through actual practice of his profession, the soldier makes maximum use of the historical record to function effectively in emergency. The facts derived from historical analysis, he applies to conditions of the present and proximate future, thus developing synthesis of appropriate method, organization, and doctrine.”<sup>3</sup>*

Douglas MacArthur

The idea presented above guides analysis of current efforts to shape the Marine Corps Engineer community. Engineer organizations have been critical to Marine Corps operations since the establishment of the advance base force at the beginning of the 20th century.<sup>4</sup> Since that time, the mission, training and organization of engineer formations has evolved continuously in response to varying circumstances to include conflicts, warfighting concepts and doctrine, and fiscal constraints. The composite influence of historical context, doctrinal concepts, conflict circumstances, fiscal trends and anticipated future requirements has shaped engineer structure into the organization as it exists today. Comprehension of these prominent factors that have existed throughout the Marine Corps Engineer’s institutional history contributes to judgments related to current and future organizational posture.

Conflict has served as the catalyst for doctrinal changes that have prompted engineer maturity. World War II and amphibious doctrine expanded engineer requirements while post war draw down, the Atomic Age and onset of the Cold War further shaped engineer organization. The Vietnam War, Desert Storm, and the Long War with Operations Iraqi Freedom and Operations Enduring Freedom further shaped engineer elements. Doctrinal concepts such as air-land battle, warfighting, operations maneuver from the sea further molded

engineer mission and organization. It is through this lens that plans for future organization are assessed.

Engineers were originally conceived for combat service support functions such as construction, maintenance and facilities operations.<sup>5</sup> As Marine Corps functions increased, engineer requirements expanded to include combat and combat support functions such as assault breaching, obstacle reduction and fortification construction. Further development resulted in responsibilities in functional areas of mobility, countermobility, survivability and general engineering.<sup>6</sup>

Recent experience in conflicts in Iraq and Afghanistan and the anticipated draw down associated with conclusion of these efforts has compelled significant changes in Marine Corps structure and organization. This evaluation of Marine Corps employment concepts coupled with the reality of emerging fiscal constraints has thereby prompted significant change in engineer organization. Changes are intended to reflect lessons learned from recent conflicts, prepare for future contingency and fulfill requirements within resource constraints.<sup>7</sup> These changes warrant discussion.

This Master of Military Studies Paper will develop the discussion that the changes to engineer organization directed as a result of recent force structure analysis present significant challenges to the operational effectiveness of engineer formations. While the prescribed changes are intended to “provide a strategically mobile, middleweight force optimized for rapid crisis response and forward-presence”<sup>8</sup>, analysis of the historical development of engineer organizations, doctrinal employment and the relationship with the joint force informs the opinion that these initiatives require focused attention, action and continued evaluation and

refinement to ensure that Marine Corps engineers provide continued responsiveness to supported force requirements.

The argument is developed in a progression of five elements. First the discussion frames the scope of the engineer discussion with a summary of engineer formations that exist in today's Marine Air Ground Task Force (MAGTF). Secondly, this description is followed by historical review of the development of the Marine Corps engineer establishment. This discussion describes the confluence of history, conflict, and strategic concept in effecting the development of the Marine Corps engineer establishment. The third element articulates proposed changes to MAGTF engineer organization and rationale. The next element demonstrates the challenges for engineer formations resulting from recent changes and suggests mitigating measures. Finally, the discussion concludes with a summary review of assertions. Enhancement of understanding of original inception and purpose, illustration of factors that influenced Marine Corps engineer organizational evolution, and anticipated future implications of current changes ensures that affected interests are constructively informed.

## **TODAY'S ENGINEERS**

Marine Corps engineer formations addressed in this thesis span the Marine Corps and the joint force. Marine Corps Warfighting Publication 3-17 *Engineering Operations* explains that engineer units that support the MAGTF exist in each element and include Naval Construction Forces (NCF) when necessary.<sup>9</sup> Engineer staff personnel exist in the command element (CE); a combat engineer (CEB) unit supports the ground combat element (GCE); an engineer support battalion (ESB) supports the logistics combat element (LCE); and engineer operations divisions within Marine Wing Service Support Squadrons (MWSS) support the air combat element (ACE). Naval Construction Force Units at times operate under the operational

control of the MAGTF. (Appendix 1) Although Naval Construction Forces exist in a separate service the relationship with the Marines has existed since World War II and is integral to the MAGTF.<sup>10</sup>

This basic understanding of current MAGTF engineer organization is critical in understanding implications of both Marine Corps force structure changes and joint force structure changes that impact Navy Construction Forces and consequently MAGTF engineering capability and capacity. The historical discussion that follows informs understanding of today's organization and portends future outcomes.

## **HISTORY**

### **Inception Through the Cold War**

Early in Marine Corps history military engineering functions were carried out by personnel within existing formations. When the Marine Corps assumed the mission of seizure and defense of advanced naval bases, the need arose for a unit with engineering as its principal mission. Marine Corps Commandant John A. Lejeune explained in the Marine Corps Gazette. "This type of operations necessitated certain special and technical activities, each with its own equipment and trained personnel."<sup>11</sup> These personnel were intended to provide construction, maintenance, facilities operation, and general services to construct, repair and operate newly acquired bases. "The first engineers were blacksmiths, railroad engineers, tinkers, construction workers, and common laborers."<sup>12</sup>

The first engineer company formed in 1913 at Marine Barracks, Philadelphia, Pennsylvania as part of a fixed defense regiment as an engineer and machine gun company. The company participated in several exercises and operations in Haiti and Santo Domingo, as well as,

occupation duty in Cuba. The unit fluctuated in size from a company to battalion through the 1920s.<sup>13</sup>

In 1927, Commandant of the Marine Corps John Lejeune published a paper in which he envisioned engineers formed as pioneer platoons in support of amphibious assaults, as well as, units responsible for the operation of captured or newly constructed advance base facilities. Initially, engineer tasks were intended as landing support type functions while the infantry was responsible for “combat engineer” type tasks such as obstacle reduction.<sup>14</sup> Throughout the 1920s and 1930s engineers performed primarily base service and support functions. Specialties included plumbing, drafting, carpentry, mechanics and painting. The engineer community in 1940 consisted of only two engineer companies.<sup>15</sup>

The Marine Corps expanded significantly with the outbreak of World War II. As the Marine Corps increased in size and complexity, larger and more specialized engineer organizations formed. Support of aviation and the capture and repair of airfields was the principle reason for engineer formation design.<sup>16</sup> Each division was assigned an engineer battalion, pioneer battalion and naval construction battalion.

During the Pacific Campaign of World War II the engineer mission further evolved into a combat role for which the engineer battalion provided assault engineer companies. Tasks included the destruction of enemy emplacements and obstacles and detection of mines and booby traps. The pioneer battalion performed landing support functions. Renamed Shore Party Battalion tasks included beach organization, establishment of supply dumps, and unloading.<sup>17</sup>

Naval construction engineers worked alongside Marine Corps engineers beginning in 1942 during World War II. This organization was comprised of more skilled craftsmen

responsible for construction of a more deliberate nature. They augmented and expanded on the construction and repair work the Marine engineers initiated.<sup>18</sup>

At the conclusion of World War II in 1945 significant analysis was conducted to determine most appropriate force organization in the Marine Corps. While force reductions that followed the war resulted in few reductions to engineer units, individual MOS's within occupational fields were significantly affected. Engineer military occupational fields were reduced from 55 to approximately 15 with no adjustment to mission requirements.<sup>19</sup> This outcome would have future ramifications.

A few years after World War II President Eisenhower developed a strategic philosophy that affected Marine Corps structure. This concept was called the New Look and reflected the recent strategic environment. "Concerned over the domestic economic implications of high defense costs and unbalanced federal budgets, as well as, the growing threat of Soviet nuclear attack, the President and his closest advisers emphasized the Air Force's strategic forces and cut Army, Navy, and Marine Corps conventional forces."<sup>20</sup>

The influence of the Atomic Age had further implications on the Marine Corps engineer community. In addition to reduction of MOSs, the Navy construction engineers were removed from Marine engineer organization and force engineer battalions were formed to support the landing force, the aviation element and reinforce the division engineer battalions.<sup>21</sup> Bridge companies were also created. Significant increases in personnel and equipment strength followed the Korean War along with broadened range of tasks. Soon these tasks became aligned with specific units. Division engineers performed basic combat support construction tasks while the force engineer battalion performed more permanent, large scale projects and support to the air wing.<sup>22</sup>

In the period that followed the Korean War, the Marine Corps continued organizational refinement. Major General Robert E. Hogaboom convened a board in 1956 that examined Marine Corps doctrine and organization. The Hogaboom Board studies that were endorsed by the Commandant in 1957 effected changes that remained relatively unchanged for the next 20 years. “The board doubted that the Corps would fight in a nuclear war with Russia and stressed the greater likelihood of war with Communist proxies outside of Europe....streamlining and reequipping of the divisions simplified both naval and air transportability. On the other hand, the board took substantial calculated risks with fire support and logistical capability. Close air support (CAS) and naval gunfire would offset artillery and tanks. Logistical organizations that sustained operations would require considerable improvisation in the face of the enemy.”<sup>23</sup>

The Flexible Response strategy of the Kennedy administration further influenced change to Marine Corps forces. “The new policy stressed conventional force improvements in manpower, equipment modernization, and strategic mobility.”<sup>24</sup> Further reorganization of engineer units reflected this philosophy. The engineer battalion underwent additional change with redefinition and re-designation of division engineer battalion to pioneer battalions in which their role was more narrowly defined and equipment and personnel reduced with assets redistributed to the force engineer battalion. In 1963 the pioneer battalion was renamed engineer battalion and in 1976 named combat engineer battalion.<sup>25</sup>

The military buildup in Vietnam expanded the engineer role. Five engineer battalions operated under the Brigade Engineer Group, III MAF and two Marine Divisions while 12 Seabee battalions operated under two regiments of the Naval Construction Brigade. Regardless of unit orientation, engineer missions spanned the range of military operations.<sup>26</sup>

In the aftermath of Vietnam the Marine Corps and engineer community grappled with new requirements for weapons and equipment, as well as, strategic focus. The conflict revealed the need to modernize the Corps as an amphibious force in readiness to counter the communist threat. The Nixon Doctrine proclaimed in 1969 that American ground force commitments to stop wars of national liberation were ended.<sup>27</sup> Additionally, the Marine Corps underwent doctrinal change. Engineer support became categorized into four areas: Mobility, Countermobility, Survivability and General Engineering. In 1976, the division engineer battalion was designated as a combat engineer battalion to emphasize its combat support function.<sup>28</sup>

Another important development in the post-Vietnam era occurred as a result of Marine Corps efforts to save manpower and enhance firepower and logistics.<sup>29</sup> The Marine Corps directed a formal study to develop improved logistics support. The study findings and subsequent force structure conclusions of the Haynes report resulted in the approval by the Commandant of the Marine Corps of the creation of the Force Service Support Group in April 1975.<sup>30</sup> The Marine Wings Support Group and Division Support Groups were established in conjunction with the FSSG to “ensure the division and wing commanders that they would still retain their essential needs even as they relinquished a large portion of their logistics capabilities.”<sup>31</sup>



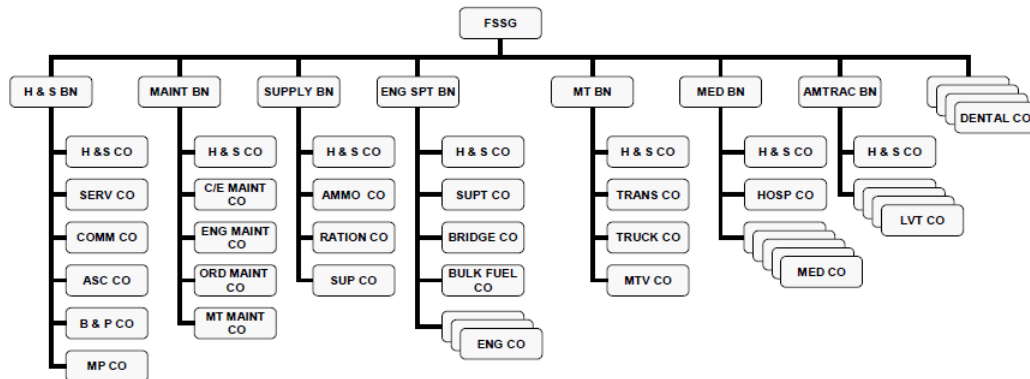


Figure 1 Force Service Support Group Organization

Most engineer capabilities were reassigned to the newly formed Force Service Support Group while the Combat Engineer Battalion remained within its supported division. Despite the restructure and post war force reductions, the combat engineer battalion was organized and equipped similarly to the pioneer battalion of the late 1950s and retained the same broad range of tasks assigned.<sup>32</sup> The Marine Corps commissioned a study of the Combat Engineer Battalion in 1986 to ensure appropriate organization for support of the GCE of the MAGTF in which the CEB structure was standardized.<sup>33</sup>

Engineer structure through the late 1970s and 1980s remained relatively unchanged. The Persian Gulf War of 1991 provided the first test of engineering organization in the MAGTF and provided the recently formed FSSG an opportunity to function for the first time as a single entity on the battle field.<sup>34</sup>

### Desert Storm to the Long War

Marine Corps engineer formations were to some extent impacted by force reductions that followed the Persian Gulf War. The division combat engineer battalion was reorganized to three engineer companies vice four, 3rd Combat Engineer Battalion was deactivated and engineer company, Combat Support Group, formed. In the FSSG, bridging and equipment

platoons were moved to the engineer support company with bridge building missions assigned to engineer letter companies.<sup>35</sup>

The 1990s was a time period in which considerable analysis was conducted to determine most appropriate alignment of engineer personnel and equipment. A study entitled “Manning and Equipping Combat Engineer and Engineer Support Battalions” was published in 1994. The study recommended merging combat engineer and engineer support battalions and advised the placement of engineer assets directly under Marine Expeditionary Force (MEF).<sup>36</sup> The Mission Area Analysis for Engineering Study of 1995 examined naval and Marine Corps engineering capabilities and assessed the ability of the MEF to perform tasks ranging from forcible entry to quality of life support.<sup>37</sup> In 1999, following force structure review in 1997, the Force Structure Planning Group (FSPG) convened to increase efficiency of engineer assets and capabilities.<sup>38</sup> The Combat Service Support study of 1999 reaffirmed the findings of Mission Area Analysis of 1995 which identified significant redundancy within the MAGTF. The study recommended a centralized engineering management organization to most effectively employ the MAGTF’s engineer assets.<sup>39</sup> These studies, however, failed to encourage substantive change in engineer organization, equipment or training.

### **Long War to the Present**

The experience from conflicts in Iraq and Afghanistan would further impact Marine Corps engineer organization, particularly in the LCE. Engineer combat service support capabilities during Operation Iraqi Freedom (OIF) were substantial. Three Engineer Support Battalions were deployed to support I MEF. 6<sup>th</sup> Engineer Support Battalion was assigned the bulk liquids mission, 7<sup>th</sup> Engineer Support Battalion was assigned the general engineering mission with taskings which included breaching operations, construction of combat service

support areas and route maintenance. 8<sup>th</sup> ESB was assigned the expeditionary bridging mission.<sup>40</sup>

Commanders that measured the performance of Marine Corps support capabilities in Operation Iraqi Freedom I (OIF) determined the need to reorganize the FSSG to create standing multifunctional logistics units that would maintain habitual relationships with supported units in order to facilitate rapid deployment of cohesive, combat trained units. The Enduring Freedom Combat Assessment Team (EFCAT) study published in August 2003 bolstered this assessment.<sup>41</sup>

The effort to organize and rename the FSSG that followed was disrupted by the return to Iraq for OIF II, however, in late 2005 the FSSG was renamed Marine Logistics Group (MLG) and Combat Logistics Regiments (CLR) and Combat Logistics Battalions were established in March 2006.<sup>42</sup> Though the ESB remained an independent battalion in the MLG the practice of deployment of engineer units in direct support of regimental combat teams (RCT) and CLBs emerged during OIF II. Engineer companies from the GCE and LCE deployed absent their

battalion headquarters.<sup>43</sup>

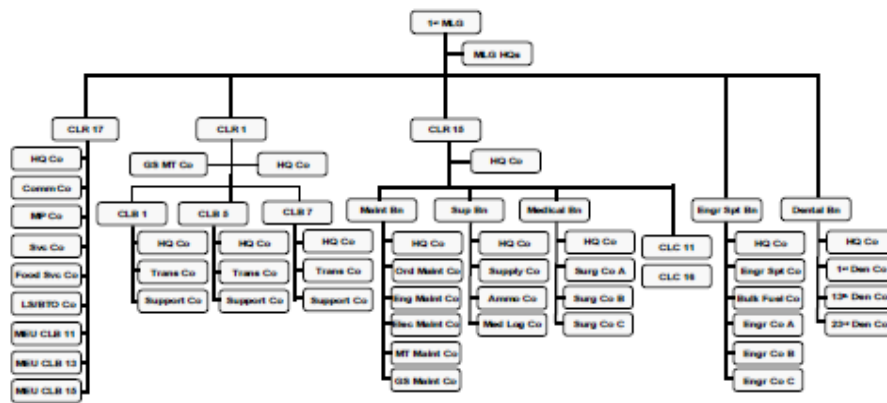


Figure 2 1st Marine Logistics Group Organization

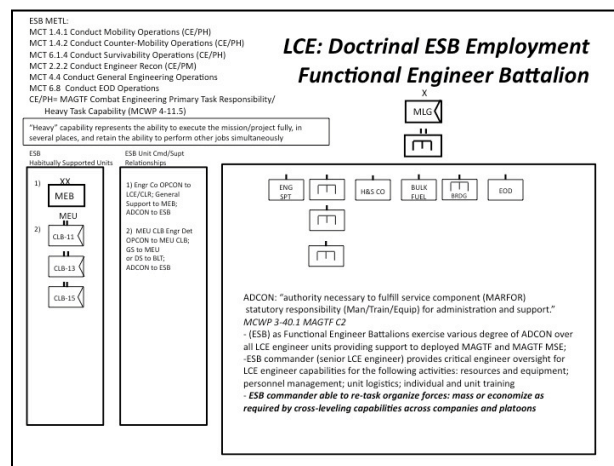
The Marine Corps shifted its focus to Afghanistan and Operation Enduring Freedom (OEF) in 2009. The MAGTF engineer support organization and employment practice remained similar to that of OIF. This method resulted in roughly 7 years of non-doctrinal employment of Marine engineers across the MAGTF.<sup>44</sup> The operational experience of Iraq and Afghanistan influenced development of the MLG and this trend of non-doctrinal deployment of engineer formations in the GCE and LCE during OIF and OEF influenced significantly outputs of the Marine Corps Force Structure Review (FSR) conducted in the fall of 2010. It is these changes that are examined further.

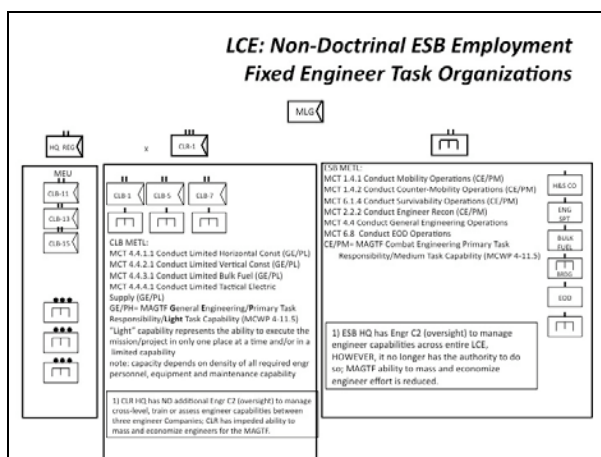
## Present Initiatives

As has been the pattern with previous conflicts in which the U.S. military has engaged, evaluation of Marine Corps force structure was again initiated. A Force Structure Review Group (FSRG) convened in 2010. The primary initiatives that impacted the engineer

community include the reduction of Marine Corps end strength from 202, 000 to 186,800 and reorganization of the Marine Logistics Groups.<sup>45</sup>

The end strength reduction requires the migration of a combat engineer battalion and bridge company from the active component to the reserves. Reshaping the MLG is intended to “establish standing combat logistics battalions habitually aligned to specific Marine expeditionary units and infantry regiments.”<sup>46</sup> As part of this effort two engineer line companies will be deactivated from the Engineer Support Battalion, equipment and personnel from that structure reapportioned to Engineer Services Companies in MEU and Direct Support (DS) Combat Logistics Battalions (CLB). Portions of Bulk Fuel Company ESB, H&S Company ESB, and Engineer Support Company ESB are also slated for realignment to Engineer Services Companies within the CLBs.<sup>47</sup>





**Figure 3 Engineer Support Battalion Organization Changes**

The purpose of this realignment is to provide a fair share engineer capability for each MEU and CLB. The method to achieve this goal involves deactivation of engineer line companies of the ESBs, the activation of Engineer Services Companies in the CLBs and direct assignment of engineer personnel to MEU and DS CLB by Headquarters Marine Corps. Directed changes associated with FSRG 2010 are slated for completion no later than FY 15. (Appendix 2) The implications of these changes are highlighted in the following analysis.

## ANALYSIS

The FSRG recommendations for reorganization of the MLG emerged from months of deliberation and a comprehensive review of its structure and were intended to meet strategic guidance and the Marine Corps Commandant's vision.<sup>48</sup> Invariably the actions determined to address selected issues, present additional difficulties that warrant attention. A constructive discussion of the challenges posed by the coming initiative and mitigating measures ensures that the Marine Corps' engineer community remains a force multiplier and provides optimal engineering support for future battlefields.<sup>49</sup>

## **CHALLENGES**

Recent initiatives attempt to address the need for habitual relationships, rapid deployability and unit cohesion. The objective is a Marine Corps force posture capable of waging successful campaigns against a broad spectrum of circumstances and threats which includes conventional forces and non-state actors.<sup>50</sup> Efforts to meet these objectives present several challenges for engineer formations. Concerns associated with contemporary actions include: degraded capability and capacity; diminished aggregate knowledge of the engineer unit; exclusion of senior engineer leadership from the assignment process for MEU and DS CLB key billets; inhibited flexibility for resource leveling; and incompatible mission and capability. The commentary that follows explains each item in greater detail.

### **Degraded Capability and Capacity**

The dilemma resulting from the deactivation of an active component engineer battalion and bridge company is the reduced capacity that results in an environment in which joint engineer capabilities may not be available. Operations in the contemporary and future security environment are expected in areas with limited infrastructure which demands responsive mobility support. If demand outpaces capacity, joint engineer capabilities such as Navy Seabees or Army engineers may not be available to the MAGTF. Force reductions and reorganization of engineer capabilities in sister services will likely limit timely support for Marine Corps forces.<sup>51</sup>

An “operationalized” reserve component is intended to fill the gap for deactivated units. These elements will not be postured to appropriately respond. “Engineers must be able to rapidly and seamlessly transition across diverse missions ranging from enabling operations, restoring services, and supporting force protection to supporting maneuver forces engaged in combat operations.”<sup>52</sup> Construction efficiency and technical knowledge are perishable skills.

The experience and skill required for execution of the full range of engineer capabilities will be a difficult challenge with limited training time available to reserve component engineer formations.

### **Diminished Aggregate Knowledge**

The FSRG plan requires deactivation of two Combat Engineer Companies (CEC). The deactivated structure realigns as part of a direct support CLB Engineer Services Company. Staff structure and equipment from Bulk Fuel Company, Headquarters and Service Company and Engineer Support Company of ESB are also realigned to support this approach. Staffing man, train and equipment issues specific to the engineer community could be hampered by the bureaucracy of having multiple layers of staff with dissimilar expertise between the end user and engineer resource or advocate. Additionally, uniformity of procedure, timeliness of equipment fielding, and access to appropriate school could be degraded for units removed from the engineer battalion.<sup>53</sup> Seemingly inconsequential details such as these can diminish effectiveness over time.

Besides reduction of personnel, equipment and materials another significant consequence of reorganization of the ESB is the loss in intellectual capital. The structure that departs the ESB takes with it the breadth of leadership and experience affected billets represent. This mission assignment coupled with the increased complexity of the current operating environment which demands engineer support tasks that range from bilateral training to infrastructure development projects requires the widest range of skills. The removal of structure from the battalion reduces availability of personnel with proficiency across the broad spectrum of engineer tasks.<sup>54</sup> The broad nature of the engineer military occupational specialty reduces the opportunity for experience and exceptional proficiency for the entire scope of skills. The unit



relies upon the composite of the varying experience of personnel from across the MAGTF to ensure that all skill sets are available. Reduction in the capacity reduces the pool from which these skill sets can be drawn.

An additional dimension relates to the Marines that are assigned as part of the Engineer Services Company in the CLB and the Marine engineers directly assigned to the MEU CLB. Just as reduction in structure of the ESB reduces access to varying experiences and skill, realignment to a combat logistics battalion isolates assigned personnel from the aggregate engineer knowledge that exists in the Engineer Support Battalion. The Engineer Support Battalion contains significant numbers of SNCOs and Officers with years of experience and broad exposure to varying mission sets. Senior officers and SNCOs in the utilities and hygiene support, heavy equipment operation and maintenance, combat engineer operations and bulk fuel support. This exposure and mentorship is critical to development of engineer personnel.<sup>55</sup> This breadth of experience is not available in the engineer services company of the direct support CLB or platoon within the MEU CLB.

### **Exclusion of Senior Engineer Leadership**

The direct assignment of engineers to the MEU CLB is another matter of concern. Previously, engineer platoons for the MEU and direct support CLBs were assigned as fully formed units that had been selected and developed to ensure that the unit had capable leadership and that they were trained to proficiency across required functions. Direct assignment to combat logistics battalions eliminates this process. “This divests the senior engineer (ESB commander) of custody, responsibility and oversight of over half the LCE engineer labor and equipment...and removes ESB commander discretion and oversight of engineer personnel assignments for MEU CLB engineer detachments and gives it to Headquarters Marine Corps.”<sup>56</sup> This method creates a

circumstance in which a gaining commander that does not have engineer experience or background will be assigned personnel with unknown capabilities and little recourse for corrective action if personnel assigned are ineffective.

### **Inhibited Flexibility for Resource Leveling**

The divestiture of structure from the ESB has further repercussions with regard to command and control. The Engineer and EOD roadmap highlights the need to provide the full range of engineer capabilities in support of distributed operations but must retain the ability to mass capabilities when required to support larger operations or major projects and further describes that “engineers must be able to rapidly and seamlessly transition across diverse missions ranging from enabling operations, restoring services, and supporting force protection to supporting maneuver forces engaged in combat operations.”<sup>57</sup> Planned alignment of engineer assets challenges accomplishment of these requirements.

Engineer requirements are driven by the scope of the mission. Execution of the assigned mission is influenced by logistics and time constraints. Disaggregated engineer elements assigned to separate battalions possess limited capacity. Missions of a scope greater than the organic capability require additional resources that must be leveraged from outside elements. This coordination increases planning timelines.<sup>58</sup> If insufficient expertise is available to accurately scope a mission more time may be lost. Limitations in the application of construction management principles exist with the disaggregated framework. The ability to resource level in case of construction delays is inhibited due to limited span of control of engineer capabilities. The authority to adjust work schedules, shift priorities, and conduct quality control will exist at command levels likely distant from mission sites which will slow responsiveness of support.

## **Incompatible Mission and Capability**

As the GS Engineer battalion for the MAGTF the ESB is expected to meet support requirements across all major subordinate commands (MSC) Division, Wing, Logistics Combat Elements. General support tasks include receipt, storage, and distribution of bulk liquids, water purification, hygiene services, electric power generation and distribution, and horizontal and vertical construction and also base development support, facilities management and restoration of basic host nation utilities services. The ESB is also required to execute construction, repair and maintenance of roads and bridges; provide EOD support and reinforce combat engineer tasks associated with the Division combat engineer battalion.<sup>59</sup> Attachment of engineer capability to a DS CLB comes at the expense of the ESB which is assigned as the MAGTF general support engineering capability. The limited capacity of Engineer Services Companies and reduced capacity of the ESB will reduce overall engineer capability for the MAGTF and reduce the ability of these units to meet mission mandates.

The ESB possesses the most capable staff for effective planning, design, quality control and employment of engineer assets. The directed arrangement of engineers in the MAGTF eliminates the training, mentorship and field grade level engineer supervision from a significant portion of MAGTF engineers.<sup>60</sup>

Each Engineer Services Company aligned with a CLB is built around combat engineers and engineer equipment operators with a modest utilities, bulk fuel, maintenance, and motor transportation capability. This construct limits engineer support to provision of point services and little capability for general support. With limited horizontal and vertical

construction capacity, reliant on external support for security and lift and no design, survey or bridging capability, these units will not meet the spectrum of engineer support required.<sup>61</sup>

The trade-offs of capabilities and capacity and risks associated with the organizational design adopted by the FSRG is understood. The direction chosen emphasizes the Marine Corps as a Middle Weight force.<sup>62</sup> This alternative favors fighting the MEB built around the regiment vice fighting the MEF level MAGTF. Issues for engineers that will emerge from this selection are highlighted in previous dialogue. The discourse that follows discusses actions necessary to mitigate potential detrimental effects of reorganization so that engineer forces remain postured and able to meet the demands of future contingencies.

## **MITIGATION**

Concerns associated with contemporary actions include: degraded capability and capacity; diminished aggregate knowledge of the engineer unit; exclusion of senior engineer leadership from assignment process for MEU and DS CLB key billets; inhibited flexibility for resource leveling; incompatible mission and capability. The following argues that alternatives exist to moderate unfavorable elements of anticipated changes. These factors properly managed can help mitigate anticipated negative effects and contribute to continued success for engineer formations.

### **Degraded Capability and Capacity**

Awareness by planners of engineer capabilities that exist across the MAGTF and within the Joint Force, along with mechanisms to enable interoperability, is critical in meeting operational demand. Significant active component capabilities remain in all elements of the MAGTF. Forward thinking and effective planning are important mechanisms to anticipate potential engineer capability shortfalls so that sufficient external support can be leveraged.

The Engineer Support Battalion remains a formidable source of personnel and equipment. The Engineer Support Battalion will be reduced by approximately 500 personnel with the departure of two combat engineer companies and related equipment and personnel from Engineer Support Company, Bulk Fuel Company and Engineer Services Company. The ESB, however, will retain over 1100 personnel and retain most principal end items in its structure and will remain a significant capability.(Appendix 2) Furthermore, while force structure reorganization has realigned engineer assets within the MAGTF, the overall engineer capacity in the MAGTF overall is not vitally diminished.

Engineer demand that surpasses engineering support beyond the Marine Corps expeditionary focus doctrinally is provided by the Navy. Additional support can be provided by the Army and in some cases by the Air Force. As a last resort contractors can be leveraged to supply capabilities.<sup>63</sup> The relationship between Marine Corps and Navy engineers is indicated in doctrine and terms of reference but a more formal and permanent relationship is recommended at the command level between each MEF and NCR to promote development of war plans and promote better understanding of complementary and unique capabilities.<sup>64</sup> Streamlining the response to a demand signal will help manage requirements.

### **Diminished Aggregate Knowledge**

The daily interface between the engineer leadership resident in the ESB and subordinate engineer leaders in the engineer companies cannot be replicated. There are, however, alternatives available to ensure that the engineer specific knowledge is available to elements separated from the functional engineer battalion. Cross-training, data reach back, and Professional Military Education and interface between units will facilitate engineer training and equipment readiness.<sup>65</sup>

Initiatives are underway for the ESB headquarters staff to act as the focal point of engineer knowledge within the MLG and to act as a training cadre for execution of higher level training and readiness tasks. Furthermore, available access to design and planning capabilities and data reach back for Engineer Services Companies and consistent interface between the ESB and Engineer Service Companies resident in DS CLBs will promote a consistent standard of proficiency and ensure seamless re-aggregation when necessary.<sup>66</sup> Effective cross training among the engineer battalions and CLBs with assigned engineer assets will ensure healthy command relationships and that requisite knowledge continues to pass between units.

### **Exclusion of Senior Engineer Leadership**

Direct assignment of engineers to MEU and DS CLBs is another area of concern. The direct assignment of engineers to MEU CLBs “removes ESB commander discretion and oversight of engineer personnel assignment for MEU CLB engineer detachments.”<sup>67</sup> Although the ESB commander is deprived the opportunity to develop a fully formed unit for assignment, as the senior engineer officer in the LCE, the commander should be allowed input in the proper placement of engineer leaders within the command. Communication between the ESB commander, higher headquarters staff, the gaining unit and the officer and enlisted monitors is essential in ensuring that engineer elements are staffed for optimal performance.

### **Inhibited Flexibility for Resource Leveling**

Engineers have struggled to resolve issues associated with command and control of engineer capabilities from inception. Several concepts have been explored to ensure responsive employment to include the formation of a Force Engineer Group concept in the mid 1950s, the Force Engineer Group deployed in Vietnam, and the MEF Engineer Group during Desert Storm.<sup>68</sup> Recently in Iraq the Naval Construction Regiment controlled Marine engineer forces

and in Afghanistan a separate engineer staff section known as the G/C-7 was formed to manage employment of engineer elements across the MAGTF to include sister service and contracted capabilities.

In current circumstances with no expectation of establishment of additional staff structure it is critical that the engineer staff section at the major subordinate command level is appropriately manned. While many engineer issues can be resolved laterally, the MSC engineer staff is in a position to influence command/support relationships and anticipate requirements for application of engineer resources across the MSC and the MAGTF. Capable engineer staff sections at each level from battalion through MEF and vocal engineer commanders are critical in leveraging and balancing engineer resources for employment to their fullest potential.<sup>69</sup>

### **Incompatible Mission and Capability**

The divestiture of engineer companies from the ESB and establishment of Engineer Services Companies warrants revision of mission essential task assignments. In previous force structure development, task organization and equipment were aligned to meet the mission. Current reorganization efforts first realign personnel and equipment structure to provide a fair share capacity in the absence of analysis of the mission.<sup>70</sup> Examination of the Marine Corps Task List against unit composition indicates the need for mission adjustment. “The ESB...is the only LCE formation with the capability and capacity to conduct full spectrum general engineering operations.”<sup>71</sup> This reality requires revision of unit METLs for ESBs and DS CLBs. The effort to do that is underway and must be completed to ensure that capabilities match mission requirements and that readiness reporting is accurately informed.

## **CONCLUSIONS**

The direction of the latest reorganization of Marine Corps engineer structure is determined. Informed by previous discussion regarding consequences of reorganization of engineer formations, leaders of effected equities can move forward with implementation of Marine Corps initiatives. Constant critical analysis and feedback are crucial in achieving refinements to ensure appropriate engineer organization and employment in execution of mission assignments within mission constraints. Analysis of historical materials provides perspective by which judgment of future outcomes is enhanced. Deductions based upon awareness of previous history, current circumstances and anticipated future reveals several consequences. As the current course is set, deeper understanding of the issues associated with the chosen action, along with mitigating alternatives, should dominate the discussion rather than argument of position in support of or contrary to the chosen design. Historical perspective and enhanced understanding of related issues promises responsible transition to the future structure.

From its inception in the early 1900s to the present day Marine Corps leaders have worked to meet mission requirements within operational, political and fiscal constraints and develop optimal doctrine, training and equipment to best service the MAGTF and Joint force. The Marine Corps engineer force evolved over time in concert with increased complexity and mission requirements of Marine Corps forces. Originally organized for service support functions, the Marine Corps engineer force increased capability in response to needs of the conflict. Marine engineer capability evolved through the conflicts of World War II, the Korean War, Vietnam, the Cold War, Desert Storm and the Long War and the draw downs that accompanied conclusion of each conflict.

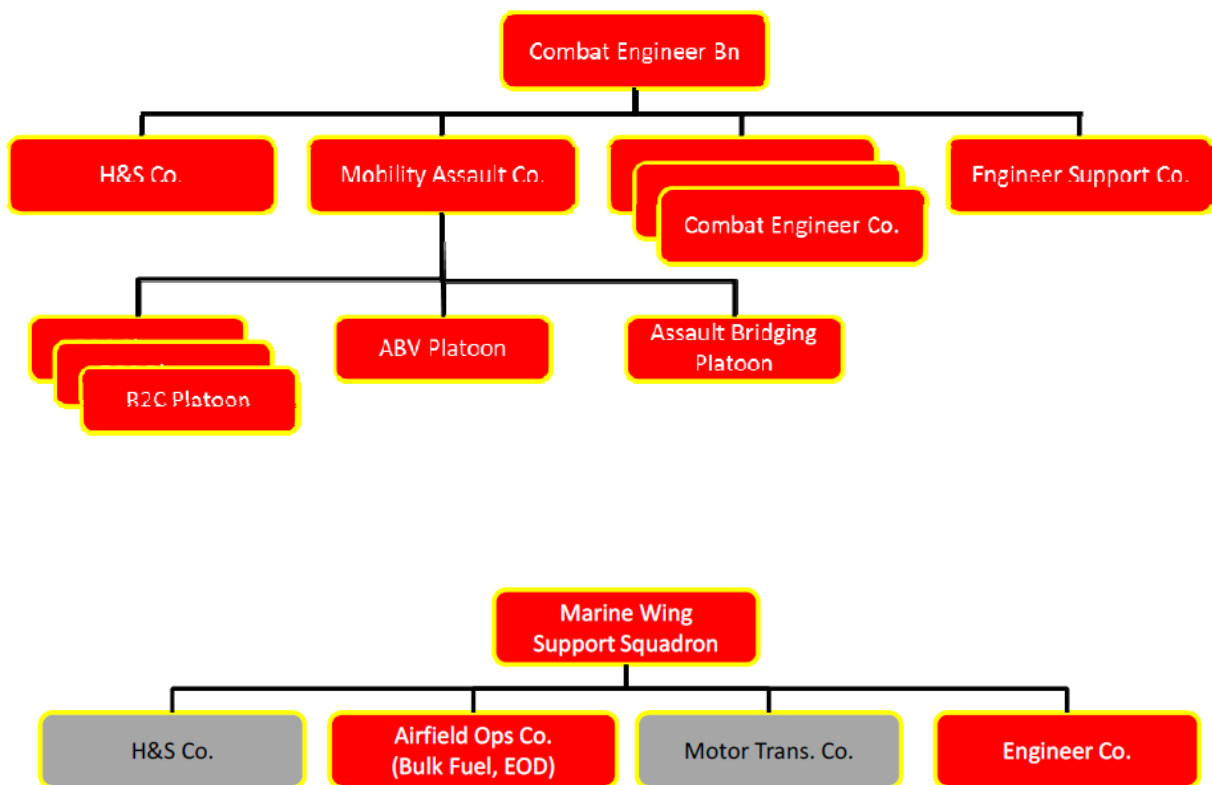


Marine engineer organization has been constantly scrutinized. The historical analysis of 1989 highlighted persistent challenges that remain today. Multiple studies during the 1990s sought to balance mission assignments with equipment sets to meet the Cold War threat. The completion of operations in Iraq and Afghanistan signaled additional analysis and change. Most recently, directives of the Force Structure Review Group affect perhaps the most significant change to Marine Corps engineer formations since the end of the Cold War. These changes prompted the discussion of potential consequences of these changes.

Determination of future consequences of present decisions requires historical perspective. Through the lens of the history of the evolution of engineers a number of common trends are evident. Engineer organization has evolved based on competing influences of strategic philosophy, world conflict, and fiscal constraint. Furthermore, engineers have long endeavored to optimally balance equipment capabilities and mission assignments. Additionally, while the complexity and demands for engineering capability has increased significantly, specialization has decreased producing broad capability with varying proficiency in specific areas.

The Marine Corps engineer community has come a long way in size, complexity, capability and criticality for mission success. From initial orientation as a service support organization through the realization of its function as a combat arms organization the Marine Corps engineer community has become a complicated organization that presents numerous challenges that require serious intellectual investment in determining most appropriate employment for optimal performance. Continued reflection and effort will ensure future success of Marine Corps engineer organizations.

## APPENDIX 1





## APPENDIX 2

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**FSRG:**

***CE, GCE and ACE (AC) Highlights***

- **Command Element** – Establish 5 Standing MEBs
  - Reinforce MARFORs (SOC, CYBER, CENT, SOUTH, KOR)
  - Create standing 1st, 2d, & 3d MEB CEs
  - Create 1-Star MEB CE for CENTCOM (5th MEB)
  - Create embedded 1-Star MEB CE for AFRICOM (4th MEB)
- **Ground Combat Element** – Reduce capacity yet maintain balance
  - 8 Inf Regt HQ to 7
  - 27 Inf Bn to 24
  - 10 Tank Co to 8
  - **3 CEBs to 2**
  - **3 Mobile Assault Co to 2**
  - 3 HIMARS Batteries to 4
  - 9 Cannon Bn to 7
  - 5 Truck Co to 3
- **Aviation Combat Element** - In concert with Aviation Plan / Modernization
  - 25 F/W TACAIR Squadrons to 21
  - 36 AC RW Squadrons to 32
  - **4 MWSG HQ to ZERO**

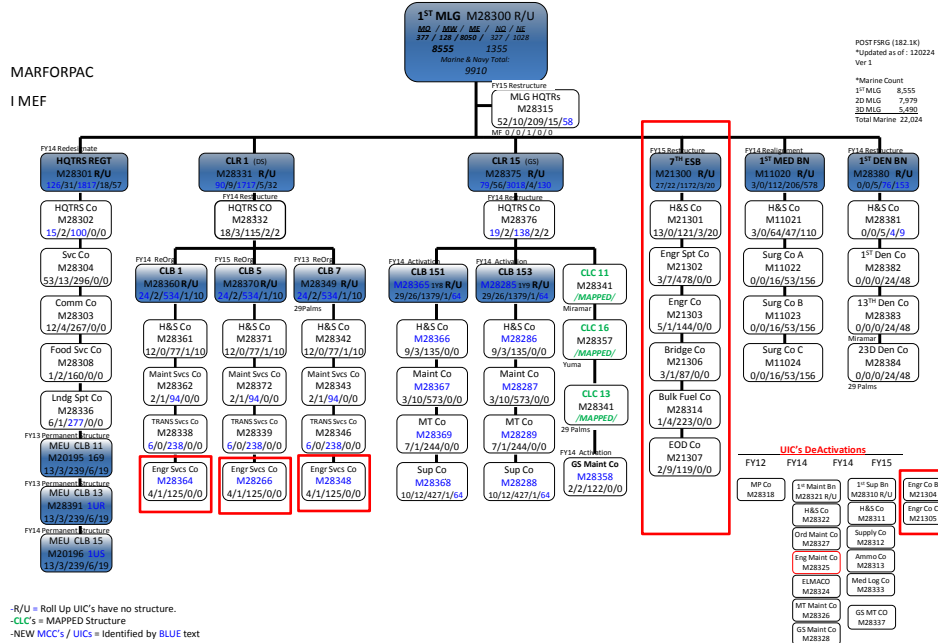
1

UNCLASSIFIED

# 1ST Marine Logistics Group (FY13-15)

MARFORPAC

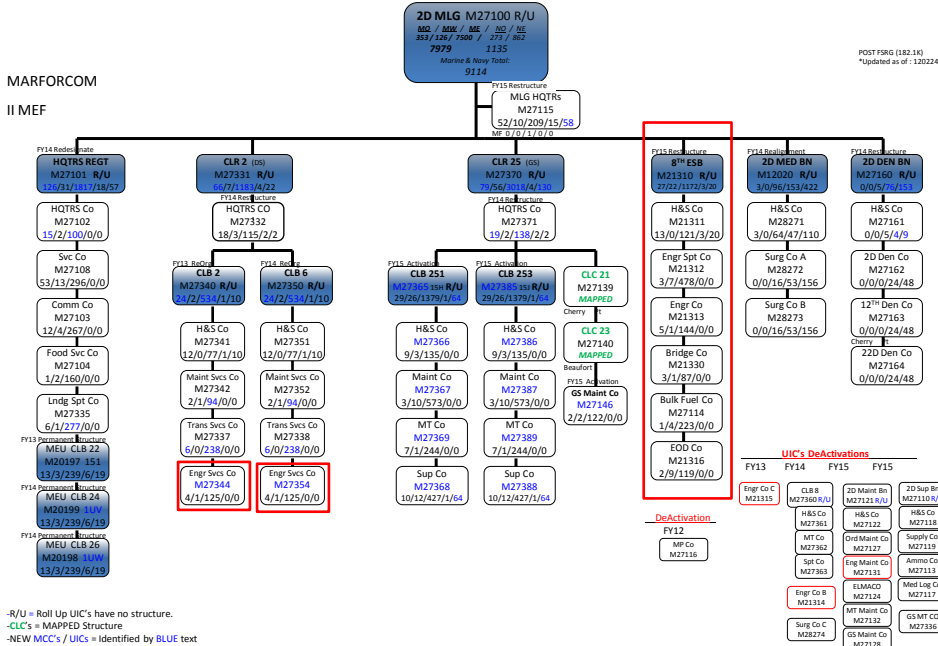
I MEF



# 2D Marine Logistics Group (FY13-15)

MARFORCOM

II MEF



[illegible]

## Endnotes

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- <sup>2</sup> 35th Commandant of the Marine Corps Commandant's Planning Guidance. Washington, D.C.:Headquarters, United States Marine Corps, 2010, 14.
- <sup>3</sup> J. D. Grelson *Engineer! Comments on the Evolution of the Marine Engineer*. Washington, D.C.: Headquarters, United States Marine Corps, 1989, 1.
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- <sup>5</sup> Grelson, 2.
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- <sup>8</sup> 35th Commandant of the Marine Corps Commandant's Planning Guidance. Washington, D.C.:Headquarters, United States Marine Corps, 2010, 14.
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- <sup>12</sup> Grelson, 1-2.
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- <sup>19</sup> Grelson, 11-12.
- <sup>20</sup> Millet, 518.
- <sup>21</sup> Grelson, 12.
- <sup>22</sup> Ibid, 13.
- <sup>23</sup> Millet, 525-527.
- <sup>24</sup> Ibid, 545.
- <sup>25</sup> Grelson, 15.
- <sup>26</sup> Ibid, 16.
- <sup>27</sup> Millet, 580, 596.
- <sup>28</sup> Grelson, 19.
- <sup>29</sup> Millet, 615-617.
- <sup>30</sup> Collins, 11-12. The monograph Rethinking Logistics Organizations of the Marine Expeditionary Force: A MAGTF Solution provides a detailed explanation of the development of the FSSG and MLG constructs.
- <sup>31</sup> Ibid, 12.
- <sup>32</sup> Grelson, 20.

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- <sup>33</sup> Jeffrey W. Miller, "A Background for Change." *Marine Corps Gazette* 88, no. 5 (May 2004, 2004), 51.
- <sup>34</sup> Collins, 13.
- <sup>35</sup> Marine Corps Force Structure Plan, 1991, Headquarters, United States Marine Corps, Ground Combat Element Structure, Tab D.
- <sup>36</sup> Miller, 51.
- <sup>37</sup> Ibid, 51.
- <sup>38</sup> Ibid, 51.
- <sup>39</sup> Ibid, 52.
- <sup>40</sup> Melissa D. Mihocko, *U.S. Marines in Iraq, 2003 Combat Service Support during Operation Iraqi Freedom*. Washington, D.C.: History Division, United States Marine Corps, 2011, 9.
- <sup>41</sup> Collins, 23.
- <sup>42</sup> Ibid, 27.
- <sup>43</sup> Craig P Eck. "(Mis)Employment of Engineer Assets." *Marine Corps Gazette* 91, no. 6 (Jun 2007, 2007), 46.
- <sup>44</sup> James H. Bain "Combat Engineers Understanding Your Role." *Marine Corps Gazette* 96, no. 1 (January 2012, 2012), 17.
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- <sup>46</sup> Ibid, 15.
- <sup>47</sup> David O'Brien. "False Economy: How Fixed Engineer Task Organizations Break the MAGTF Mobility Bank." Unpublished manuscript, 2.
- <sup>48</sup> David Van Bennekum. "The Re-Structuring of the Marine Logistics Group." Unpublished manuscript.
- <sup>49</sup> Heesacker, 20.
- <sup>50</sup> F. G. Hoffman "Posturing the Corps for the 21st Century." *Marine Corps Gazette* 96, no. 12 (December 2012, 2012), 32.
- <sup>51</sup> John Martinko (CO, 7<sup>th</sup> Engineer Support Battalion), phone discussion with the author, February 2013.
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- <sup>55</sup> Michelle Macander. "Engineering Efforts within the Marine Logistics Group - Why the Concept of Fair Share Doesn't Work." Unpublished manuscript, 5-6.
- <sup>56</sup> Obrien, 2.
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- <sup>58</sup> Christopher Downs (Former CO, 8<sup>th</sup> Engineer Support Battalion), phone discussion with the author, February 2013.
- <sup>59</sup> Engineering Operations, 1.
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<sup>62</sup> "Reshaping America's Expeditionary Force in Readiness Report of the 2010 Marine Corps Force Structure Review Group." *Marine Corps Gazette* 95, no. 5 (May 2011, 2011): 12-16.

<sup>63</sup> *Naval Engineering Capabilities to Support Marine Corps Operations Study Executive Briefing*. Fairfax, Virginia: Northrop Grumman Information Systems, 2012, 5.

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<sup>71</sup> Guy Coursey. *Information Paper Logistics Combat Element (LCE) Mission Essential Task Lists (METLS)*. Camp Lejeune, North Carolina: Marine Corps Engineer School, 2012.

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